By R. Stephen McNeill

# Applying Decision Tree Analysis to Expedite Preference Settlements

**Editor's Note:** *For more on decision trees, see the Value & Cents article in the February 2015 issue.*

Most bankruptcy attorneys are familiar with the adage that 99 percent of preference cases are settled before trial. Indeed, all across the legal landscape, alternative-dispute resolution continues to gain traction, primarily because of the substantial cost savings that these mechanisms offer. To properly advise clients and maximize the value obtained from alternative-dispute-resolution mechanisms, counsel should prepare an early case assessment to analyze strengths and weaknesses in the case, as well as any opportunities for reasonable settlements before incurring substantial legal fees and expenses.

Although the preparation of early case assessments is becoming increasingly common, attorneys often overlook decision trees, which can be extremely powerful case-assessment tools when used correctly. As decision trees have become more widely accepted in the business world as a method to analyze decisions and their consequences, their use in legal settings has begun to grow.[1] This article will use a typical preference case to introduce decision trees as a tool to analyze and value prospective litigation with an emphasis on reaching speedy and inexpensive settlements.

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## Terminology and Evaluation

Before diving into the facts of a hypothetical preference case, this section provides a discussion of fundamental decision tree terminology. A basic decision tree is shown in Figure 1.

At its core, a decision tree is comprised of a series of decisions, represented by nodes in the diagram, and a series of branches reflecting the potential outcomes of each decision. Typically, as shown in Figure 1, there are three distinct types of nodes: decision, chance and end.

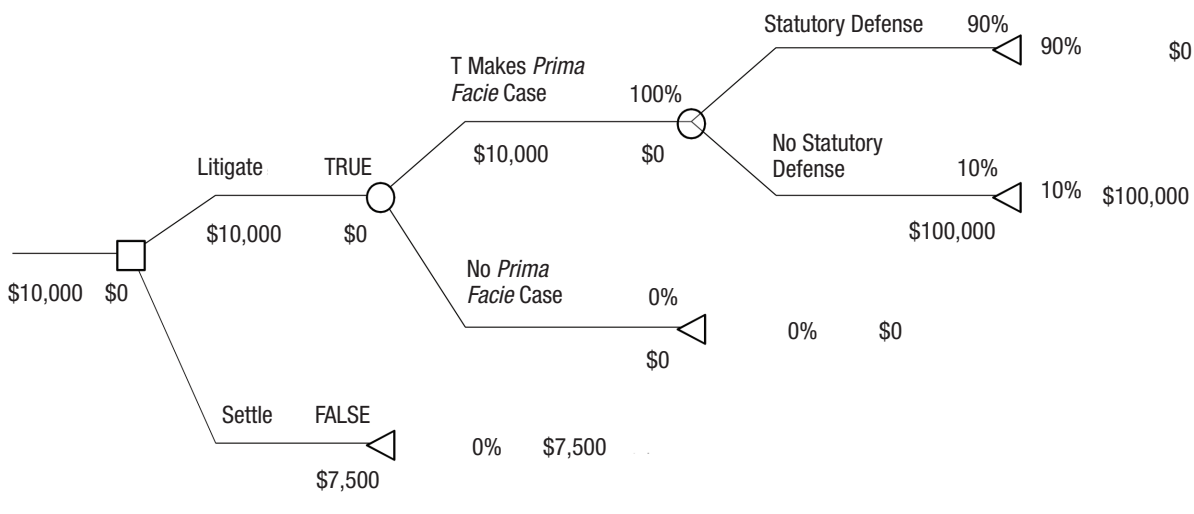
Decision nodes, depicted as squares, represent strategic decisions solely within the analyzing party's control. Since they are solely within the party's control, the party should always choose the decision that is in its best interest. Chance nodes, represented by circles, identify uncertainties that are outside of the party's control. Essentially, chance nodes are used to assign probabilities to risk factors that ultimately affect the outcome of litigation. Finally, end nodes, represented by triangles, show the probability and value of each scenario.[2]

The probability-weighted average value of all scenarios is known as the expected value of the decision tree. The expected value in a decision tree analyzing litigation is the anticipated

1 Notably, the use of decision trees by mediators is well established. *See American Arbitration Association Handbook on Mediation* 147-48 (Thomas E. Carbonneau ed., 2006) (discussing use of decision trees as risk-assessment tool in mediation); and Marjorie Corman Aaron, *The Handbook of Dispute Resolution* 202-18 (Michael L. Moffitt and Robert C. Bordone, eds., 2005). Another rapidly growing application for decision trees is their use in negotiating alternative fee arrangements. *See, e.g.*, Patrick Lamb, *Alternative Fees for Litigators and Their Clients* 77-81 (Am. Bar Ass'n ed., 2014).

2 A scenario is simply a combination of branches that read from left to right.

**Figure 1**



settlement value of the given litigation, assuming that both parties are risk-neutral.[3]

Applying this terminology, Figure 1 contains one decision node, two chance nodes and four end nodes. Having four end nodes also means that there are four possible scenarios in this particular decision tree. The only decision node is a simple one containing two overarching options: settle or litigate. The two chance nodes address the fundamental preference issues of whether a plaintiff can successfully make its *prima facie* case and whether a defendant can establish a successful statutory defense.[4] Each chance node contains two possible branches with a combined probability of 100 percent between them.[5]

The expected value of a particular scenario is derived by multiplying the compound probability[6] of success in the scenario by the value assigned to the scenario. The expected value of the decision tree itself equals the sum of the expected values of each scenario. Since all defenses discussed herein are case-dispositive, only one scenario (the one where the defendant has no defense to the preference action) will yield a value greater than zero, and the expected value of the decision tree is equal to the value of that scenario.[7] The decision tree in Figure 1 has an expected value of $10,000.[8]

## Creating Decision Trees

While reading and understanding decision trees are valuable skills, a decision tree is only helpful when constructed properly. Moreover, litigation (even basic preference litigation) typically involves more than two chance nodes. Fortunately, attorneys have access to a wealth of statutes and case law to assist them with identifying legal risk factors in any litigation and converting them into chance nodes.[9] For example, § 547 provides five elements that must be established for a plaintiff to recover a preference, along with several affirmative defenses that, if proven, would eliminate or limit preference exposure. While each of these elements and defenses is technically a separate chance node, each one can be eliminated from the decision tree if one party is guaranteed to win on that issue (*i.e.*, where the probability of success or failure is 100 percent).[10]

3 Determining whether a litigant is risk-adverse, risk-neutral or risk-seeking requires an understanding of utility theory, which is beyond the scope of this article. Accordingly, this article assumes that all litigants are risk-neutral.

4 As it turns out, these two chance nodes represent the compound probability of a series of sub-decisions that will be analyzed in greater detail herein.

5 While each example discussed in this article contains chance nodes with only two branches, that is simply a reflection of the nature of a preference action and its defenses. A chance node can have any number of branches as long as their probabilities are all greater than or equal to zero and total exactly 100 percent.

6 The compound probability of a scenario is determined by cumulatively multiplying the probability of each branch in the scenario.

7 This case-dispositive feature of preference defenses will not always be present in analyzing a decision tree. For example, whether a document is admissible could be an "influencing factor" that alters the probability of success on one or more defenses and results in additional scenarios that yield positive recoveries (*i.e.*, success if admissible and success if not admissible).

8 This value is derived by multiplying the probability that the plaintiff proves its *prima facie* case (100 percent) times the probability that a defendant does not have a statutory defense (10 percent) times the total amount at issue ($100,000).

9 Factual risk factors, such as whether an invoice may be prorated, also may also need to be included in the decision tree.

10 This statement remains true of other defenses as well, including statutes of limitations and defenses based on the assumption of an underlying contract. While this article will not analyze these defenses in the decision tree discussion that follows, counsel can add them to any decision tree as additional chance nodes where appropriate.

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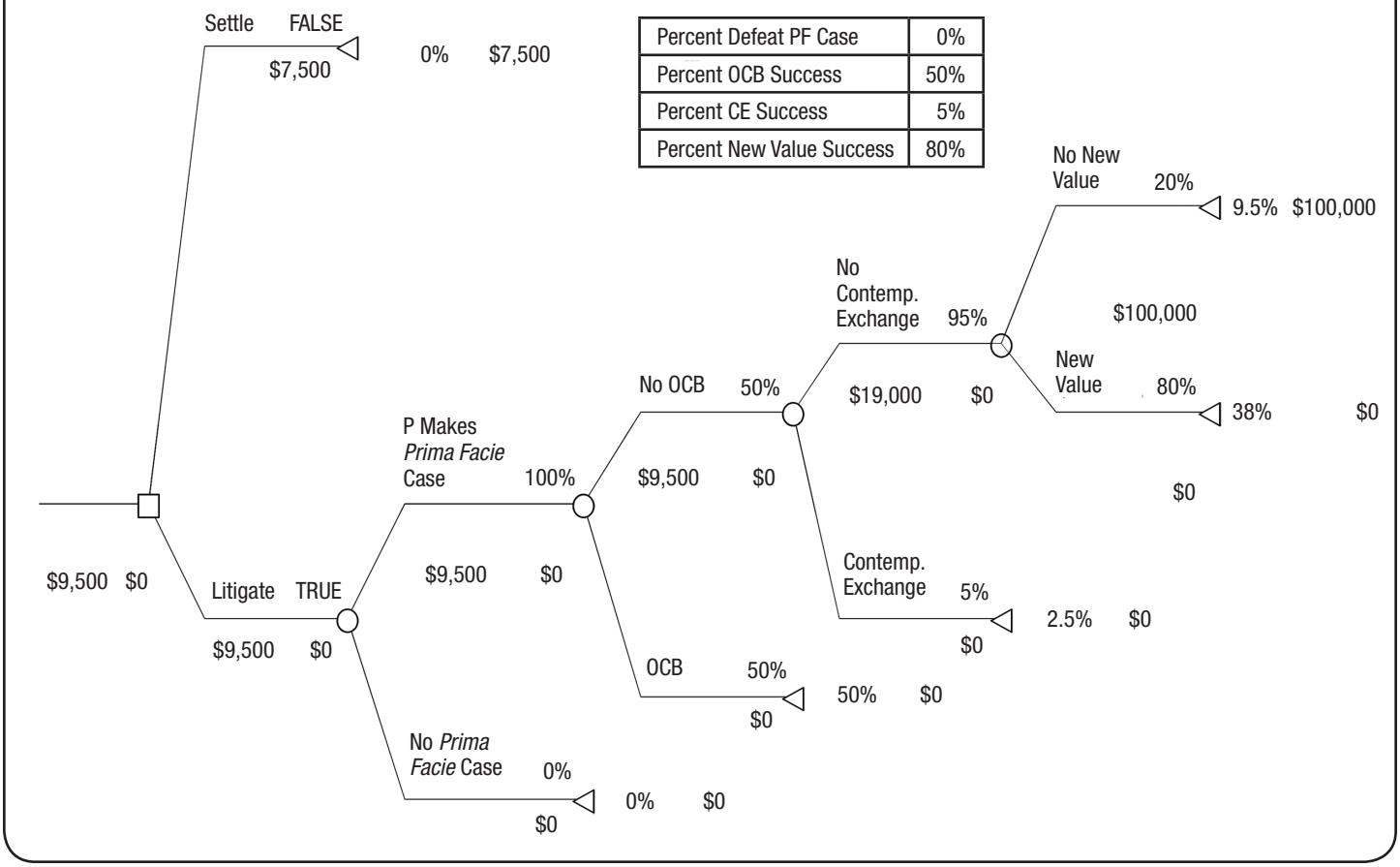
**Figure 2**



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After identifying all case-dispositive issues and constructing the decision tree, counsel must next assign probabilities to each chance node. Once again, this process should be familiar to attorneys, who often assess case-dispositive issues in this fashion. By plugging this information into a decision tree, however, counsel can evaluate multiple issues at once, leading to more-reasoned settlement offers.

## A Hypothetical Example

To apply the skills learned herein, assume that in preparing a preference analysis, defense counsel properly[11] determines that (1) the plaintiff seeks to recover $100,000 in preference payments, (2) a defendant has no basis to challenge the plaintiff's *prima facie* case, (3) a defendant has $80,000 of unpaid new value,[12] (4) a defendant received one payment of $5,000 that is subject to the contemporaneous-exchange defense and (5) a defendant has a 50/50 chance of success on the ordinary-course-of-business defense. Armed with this information, defense counsel constructs a decision tree to determine the plaintiff's expected value of the preference action. That decision tree is reflected in Figure 2.

From the foregoing information, counsel can determine that a defendant's likelihood of success on the new value defense is 80 percent ($80,000/$100,000) and its likelihood of success on the contemporaneous-exchange defense is 5 percent ($5,000/$100,000).[13] Plugging these percentages into the decision tree, along with a 50 percent chance of success on the ordinary-course defense[14] and a 0 percent[15] chance of defeating the plaintiff's primary case, yields an expected value of $9,500.[16] Having performed this analysis, defense counsel knows that any settlement below $9,500 is a proverbial win for his/her client.

## Expanding the Hypothetical and an Introduction to Subtrees

Now assume that in addition to the statutory defenses discussed herein, defense counsel subsequently learns that two other payments, in the aggregate amount of $10,000, were actually payments in advance. Consistent with the previously discussed shorthand analysis used in assigning risk on the new value and contemporaneous-exchange defenses, counsel assigns a 10 percent chance of defeating this element of the plaintiff's *prima facie* case. In addition, counsel notices that the debtor's schedules listed assets in excess of total liabilities

11 This hypothetical assumes that these facts are true and not subject to dispute. If some issue surrounding the veracity of this information arises, counsel would need to adjust the probabilities assigned to the relevant chance node or add additional chance nodes to the decision tree to assess that risk.

12 For jurisdictions that permit paid new value, those amounts would also be included in this figure. Consistent with § 547(c)(4), this amount also should not include any amounts covered by other defenses. *See* 11 U.S.C. § 547(c)(4)(B).

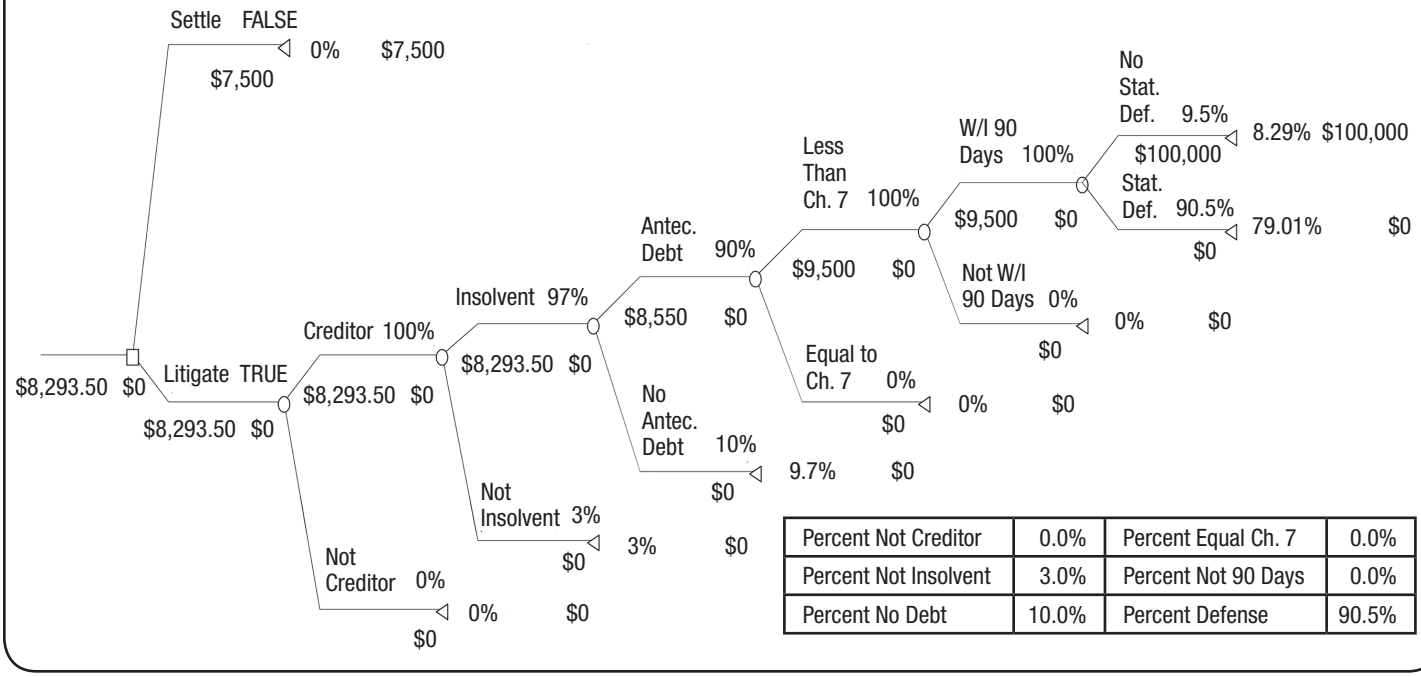
13 Technically, each alleged preference payment should be analyzed under its own separate decision tree to create the most accurate estimate of the case's value. To simplify and expedite the analysis, however, counsel can assign percentages to the risk associated with the new value and contemporaneous exchange defenses on an aggregate basis by dividing the total amount covered by such defense by the total amount at issue. Since one or more transfers may ultimately be subject to more than one defense, this approach might deviate from the result that would be derived if every payment were analyzed separately. Nevertheless, in analyzing the case for settlement purposes, this shortcut will save both time and money.

14 Unlike the aggregate analysis of the new value and contemporaneous-exchange defenses discussed in footnote 13, counsel has no mutually acceptable shorthand way to assign aggregate risk on the ordinary-course defense based on dollar values alone. Instead, counsel for either party will likely prefer to assign an aggregate percentage risk on the ordinary-course defense based on applicable case law and experience, rather than performing the mathematical computations required. Indeed, in some circumstances, counsel may be better served to rely on experience to assign aggregate risk on every defense in the decision tree, including the new value and contemporaneous-exchange defenses.

15 This chance node could be deleted from the tree without affecting the expected value.

16 This value is derived by multiplying the total amount at issue ($100,000) by the compound probability (9.5 percent) of the scenario. The compound probability equals the probability that plaintiff proves its *prima facie* case (100 percent) times the probability that the defendant does not have an ordinary-course defense (50 percent) times the probability that the defendant does not have a contemporaneous-exchange defense (95 percent) times the probability that the defendant does not have a new value defense (20 percent).

**Figure 3**




| | | | |
|---|---|---|---|
| Percent Not Creditor | 0.0% | Percent Equal Ch. 7 | 0.0% |
| Percent Not Insolvent | 3.0% | Percent Not 90 Days | 0.0% |
| Percent No Debt | 10.0% | Percent Defense | 90.5% |

at the time of filing its petition. Recognizing that challenging the debtor's insolvency bears little chance of success in light of the presumption of insolvency,[17] counsel assigns a reasonable chance of successfully rebutting this portion of the plaintiff's *prima facie* case on this issue at 3 percent.

Armed with this new information, defense counsel updates the previous decision tree to include chance nodes to evaluate the merits of the plaintiff's *prima facie* case.[18] To simplify the math, counsel simply plugs in a defendant's compound probability of success and failure[19] on the statutory defenses and creates the tree shown as Figure 3. With the decision tree now updated to reflect the new information, the expected value of the litigation falls to $8,294.50.[20]

17 11 U.S.C. § 547(f).

18 To better serve as a future reference tool, the revised decision tree includes each of the five elements that must be proven to establish a *prima facie* case. As previously noted, these chance nodes may be removed from the decision tree when the likelihood of a plaintiff's success is assigned a 100 percent risk.

19 This approach relies on what is known in decision tree terminology as a "subtree." Since the analysis of the statutory defenses represented by Figure 2 has not changed, defense counsel can simply collapse those branches of the tree into a single chance node and use the compound probabilities of the defendant's success (90.5 percent) and failure (9.5 percent) on the statutory defenses.

20 Ignoring branches with 100 percent probability, this value is derived by multiplying the total amount at issue ($100,000) times the probability that the debtor was insolvent (97 percent) times the probability that the payments were made on account of an antecedent debt (90 percent) times the probability that a defendant does not have a statutory defense (9.5 percent).

## Conclusion

Preference cases are destined to settle from the moment they are filed. By adding a basic understanding of decision trees to existing preference analyses, counsel for both preference plaintiffs and defendants gain access to a powerful analytical tool to help reach settlements more expeditiously and save clients money. While the methodologies discussed in this article will not produce a 100 percent accurate value for all cases, they are extremely useful in narrowing the potential range of settlement options, especially where counsel can agree on the structure of the decision tree itself.

Moreover, the decision trees contained in Figures 2 and 3 will apply to a significant majority of preference cases, and counsel can largely adopt these tree structures without starting from scratch with each new case. As more atypical and complex issues arise, counsel can apply these basic skills to modify the default decision trees as appropriate. Ultimately, with enough practice in creating and analyzing decision trees, attorneys can expand their use to all areas of their practices, which should result in improved client counseling and greater client satisfaction. abi